Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Conflicts of interest

The authors declare no conflict of interest

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A. Dangis, N. De Brucker, A. Heremans, M. Gillis, J. Frans, A. Demeyere, R. Symons*
Imelda Hospital, Bonheiden, Belgium
* Guarantor and correspondent: R. Symons.
E-mail address: rolf.symons@imelda.be (R. Symons)

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From ground-glass opacities to pulmonary emboli. A snapshot of the evolving role of a radiology unit facing the COVID-19 outbreak

Sir—The aim of this letter is to report what is currently happening in our Radiology Department at a tertiary infectious disease hospital in Milan, a hotspot for COVID-19, 2 months after the outbreak of the epidemic.

The early phase was highly critical, and we had to find ways to manage both suspected and confirmed cases, which involved separating them from patients undergoing imaging tests for other reasons such as oncological staging or follow-up. At the time, promptness of action was favoured amongst clinicians, and in agreement with the most recent consensus statements[1,2], computed tomography (CT) was not used as a screening test, but reserved for selected symptomatic patients. As a result, most suspected or confirmed COVID-19 patients were examined using chest radiography, thus minimising patient radiation exposure and infection transmission to the radiology staff and uninfected patients.

In the course of time, about a month after the epidemic outbreak, we noticed a sudden rise in requests for CT, mostly related to CT angiography (CTA) studies to exclude acute pulmonary embolism (PE).[3] Based on our experience of 30 consecutive CTA examinations performed in confirmed COVID-19 patients, the prevalence of PE is approximately 35%, with peripheral branch preponderance. Preliminary data indicate that approximately 5–10% of COVID-19 patients who require mechanical ventilation suffer from acute PE or deep venous thromboembolism (DVT). The probability is higher in those with signs of DVT, inexplicable hypotension or tachycardia, worsening respiratory status, or risk factors for thrombosis. The rate of micro-PE is probably even higher, as suggested by unreleased autopsy results.

As undiagnosed or untreated PE may negatively affect patient outcome, empirical therapeutic anticoagulation has been recommended; however, considering the lack of evidence regarding improvement and the risk of major bleeding, CTA should be used to confirm this diagnosis and to support any decision to start therapeutic anticoagulation.[4]

Another clinical scenario that is progressively causing an increase in CT requests is pulmonary fibrosis. In fact, COVID-19 patients, particularly those recovering from a period in the intensive care unit, are at risk of developing fibrosis.[5]

In conclusion, after having faced preparedness and diagnostic procedures, radiology departments should also be prepared to deal with these two clinical issues.

Conflict of interest

The authors declare no conflict of interest.

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N. Flor*, M. Tonolini
Luigi Sacco University Hospital, Milan, Lombardy, Italy
* Guarantor and correspondent: N. Flor. Luigi Sacco University Hospital, Milan, Lombardy, Italy.
E-mail address: nicola.flor@unimi.it (N. Flor)

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Controversy in coronaViral Imaging and Diagnostics (COVID)

Sir—We are concerned by the "Guidance for pre-operative chest CT imaging for elective cancer surgery during the COVID-19 Pandemic" authored by The Royal Colleges (Surgeons Edinburgh, Surgeons England, Physicians and Surgeons Glasgow, Surgeons Ireland and Radiology). It mistakenly argues that there is a case for screening some asymptomatic patients prior to surgery. We are also aware of pressures in our hospitals to screen patients using computed tomography (CT). There is, however, no good evidence to support such a view, which implies an understanding of the nature of screening[1] for this particular disease, which is not currently justified.

A study of 51 symptomatic patients[2] reported 98% sensitivity for CT compared to 71% for reverse transcription polymerase chain reaction (RT-PCR) in symptomatic patients. A further study of 103 symptomatic subjects[3] showed initial chest CT sensitivity 93%, specificity 53%, positive predictive value 92%, and negative predictive value of 42% compared to positive (up to four) RT-PCR. A further study of 1,049 patients[4] showed a sensitivity of 97%, specificity of 25%, and accuracy of 68% compared to RT-PCR. Table 2 in this paper helpfully gives the numbers of true-positive (580), true-negative (105), false-positive (308), and false-negative (21) tests. The accuracy is affected by the prevalence (in this case 57%).

CT data from asymptomatic individuals from the cruise ship "Diamond Princess",[5] where 41 of 76 asymptomatic subjects (54%) had lung opacity on CT is not relevant to screening as they were all RT-PCR positive. Even including all the (symptomatic and asymptomatic) subjects, CT only had 61% sensitivity for any lung abnormalities, and a 20% false-negative rate in symptomatic patients. It would seem doubtful that CT would perform better in a low pretest probability cohort of RT-PCR negative patients.

There may be a problem with the RT-PCR test used in our patients; however, it is specific, and also, different to these referenced papers. Replacing it with CT (that in patients with a high pretest probability is sensitive but of poor specificity) is problematic. As prevalence falls, a non-specific test such as CT, which does NOT test for the virus, will become highly misleading. For those who fear an insensitive RT-PCR test, supplementing it with a sensitive, but non-specific, test simply introduces a different error. The clinician is then left not knowing which one to believe. We may as well look at the sediment pattern of tea leaves (tasseography) to determine which one is correct in an asymptomatic subject.

In our department, we have been informed that "clinicians are finding it [CT] helpful". They are perhaps practising within the realm of belief rather than science[6] as any number of findings on CT could be misinterpreted as classic COVID-19 — heart failure, other infections, air trapping, poor inspiration — meaning a positive CT (using these statistics[6] and based on a 5% prevalence[7]) will have a positive predictive value of 6% meaning a patient is denied appropriate care based on the flimsiest of evidence; the negative predictive value of 99% seems perfect but is in fact only modestly "better" than not doing the test with an overall accuracy of 29%.

The illustration (Fig 1) shows a patient referred for CT for "?COVID-19" (but no COVID-19 symptoms). The radiologist reported it as "non-COVID-19" due to the presence of pulmonary oedema (effusions, ground-glass opacity) due to aortic valve stenosis (calcified valve not shown) and left ventricular dysfunction (slow transit of contrast medium on bolus tracking), which was confirmed by echocardiography; however, the C-reactive protein (CRP) was elevated and there was lymphopenia, which led other consultant radiologists to define this as either classic COVID-19 or indeterminate COVID-19. The patient was treated for heart failure and breathlessness improved, with (reportedly) no development of COVID-19 symptoms and no positive RT-PCR. The pulmonary abnormalities were visible on chest radiography (and ignoring the cardiac inferences) "chest" CT did not contribute to the patient's management.

Centres that wish to research the use of CT in screening subjects should do so, but this should be part of proper research, and using it to influence decision-making is currently wrong. There is no evidence to support screening for COVID-19 in asymptomatic patients using CT. It will

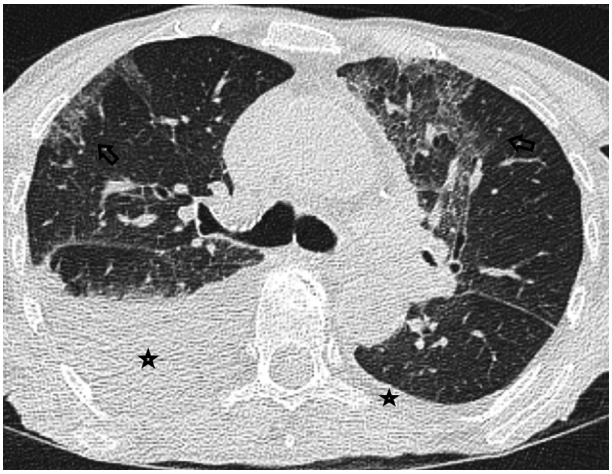

Figure 1 Chest CT image showing bilateral pleural effusions (star) and bilateral ground-glass opacity (arrow).